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		Systems Engineering, Operator Theory, Matrix Theory, Conference.	
19. ABSTRACT (Continue on reverse if necessary and identify by block number) The conference attracted 93 participants from 17 different countries and included 13 graduate students. The very latest developments in operator and matrix theory, and their uses in modern control and systems engineering were presented and discussed by many of the world's leading investigators. There were 13 plenary speakers, 36 invited papers, and 16 contributed papers.			
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FINAL REPORT

on the
International Conference on
Operator Theory: Advances and Applications
A Conference to mark the 60th birthday of I. Gohberg.
August 22nd - 26th, 1988

The conference attracted 93 participants from 17 different countries and included 13 graduate students. The organizers were pleased to have 7 participants from East Europe; 5 from the U.S.S.R. and 2 from the D.D.R.. The total number of participants was less than our early estimates and is reflected in the lower registration fees received (see consolidated amounts). Nevertheless, the quality could hardly have been improved. The very latest developments in operator and matrix theory, and their uses in modern control and systems engineering were presented and discussed by many of the world's leading investigators. There were 13 plenary speakers, 36 invited papers, and 16 contributed papers.

The total budget of about c\$ 66,000 was only achieved by very determined and prolonged fund-raising efforts on the part of the organizers. The standing of the organizers themselves in the research community was vital in our approaches to research funding agencies in Canada and the United States, and explains our relative success in accumulating about c\$45,000 from these sources. In spite of our best efforts, local industrial and commercial organizations, with the exception of Control Data Corporation, could not be persuaded to support the conference.

At the time of writing (July, 1989) the proceedings of the conference have just appeared in the form of the "Gohberg Anniversary Collection", Volumes I and II, published by Birkhäuser Verlag, Basel. Copies are being lodged with the university library, and in the Research Collection of the Department of Mathematics and Statistics, and may be consulted there.

Copies of consolidated accounts and the final detailed program are attached to this report.

P. Lancaster, F.R.S.C.
Professor of Mathematics

ORGANIZING COMMITTEES

International Organizing Committee:

P. Lancaster, Chairman, The University of Calgary.
H. Dym, Weizmann Institute.
S. Goldberg, University of Maryland.
M. A. Kaashoek, Free University of Amsterdam.

With the assistance of:

H. Bart (Rotterdam), J. A. Ball (Blacksburg), C. Foias (Bloomington),
J. W. Helton (San Diego), L. Lerer (Haifa), L. Rodman (Williamsburg).

Local Organizing Committee:

P. Lancaster, Chairman.
P. J. Browne.
P. A. Binding.



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International Conference on
OPERATOR THEORY: ADVANCES AND APPLICATIONS

held at

University of Calgary

August 21st - 26th, 1988

CONSOLIDATED ACCOUNTS

INCOME

Accounts handled by the University of Calgary (c\$):

NSERC Conference Grant	15,000
U. of Calgary Conference Grant	6,000
Control Data Corporation (donation)	1,000
Nathan and Lily Silver (donation)	1,000
U. of Calgary Dean of Science	500
U. of Calgary Department of Mathematics and Statistics	2,290
Subsidies through NSERC Operating Grants	5,500
Registration Fees	<u>4,950</u>
TOTAL	<u>c\$ 35,740</u>

Accounts handled by the University of Maryland (U.S.\$):

National Science Foundation	10,000
Office of Naval Research	10,000
U.S. Army	<u>5,000</u>
TOTAL	<u>us.\$ 25,000</u>

EXPENSESAccounts handled by the University of Calgary (c\$):

Invited speaker's travel and living allowances	24,910
Honoraria	1,850
Duplicating and Printing	850
Audiovisual, supplies, shuttle bus	660
Entertainment (banquet subsidy \$700, coffee and donut service \$840, two receptions \$920)	2,460
Conference Office "per delegate" charge	2,790
Postage, nametags, incidentals	<u>2,220</u>
TOTAL	<u><u>c\$ 35,740</u></u>

Accounts handled by University of Maryland (U.S.\$):

Invited speaker's travel and living allowances	22,295
Overhead costs to U. of Maryland	<u>2,705</u>
TOTAL	<u><u>us. \$ 25,000</u></u>

International Conference on
 OPERATOR THEORY: ADVANCES & APPLICATIONS
 A Conference to mark the 60th birthday of I. Gohberg

PROGRAM

<u>Time</u>	<u>Event</u>	<u>Place</u>
<u>SUNDAY, AUGUST 21</u>		
8:30 a.m.-6:00 p.m.	Hiking excursions.	
7:00 p.m.-10:00 p.m.	Registration and Reception	Faculty Club

MONDAY, AUGUST 22

SESSION 1 - Chair: P. Lancaster, University of Calgary E 243

8:30 a.m.-8:45 a.m.	Welcome and Opening Remarks P.J. Krueger, Vice-President (Academic) University of Calgary
8:45 a.m.-9:35 a.m.	Plenary lecture: Harry Dym, The Weizmann Institute of Science, Israel - " <i>Reproducing Kernel Spaces and Interpolation</i> "

REFRESHMENTS AND GREETINGS

SESSION 2 - Chair: S. Goldberg, University of Maryland E 243

10:10 a.m.-11:00 a.m.	Plenary lecture: M.M. Džrbashian, Armenian Academy of Sciences, U.S.S.R. - " <i>Differential operators of fractional order and boundary value problems in the complex domain</i> "
11:00 a.m.-11:30 a.m.	Invited paper: Joseph A. Ball, Virginia Tech - " <i>A Beurling-Lax invariant subspace representation theorem for rational matrix functions</i> "
11:30 a.m.-12:00 p.m.	Invited paper: T. Ando, Hokkaido University, Japan - " <i>Operator means and operator inequalities</i> "

LUNCH

SESSION 3 - Chair: C. Davis, University of Toronto

E 243

- 1:10 p.m.-2:05 p.m. Plenary lecture:
Donald Sarason, University of California
at Berkeley - *"Some function-theoretic
questions connected with the AAK
parameterization"*
- 2:05 p.m.-3:00 p.m. Plenary lecture:
Alexander Dynin, Ohio State University -
*"Multivariable Gohberg-Krupnik Operator
Algebras"*

COFFEE/TEA

SESSION 4a - Chair: P.A. Binding, University of Calgary

E 243

- 3:30 p.m.-4:00 p.m. Invited paper:
B. Textorius, University of Linköping, Sweden -
"Directing mappings and spectral functions"
- 4:00 p.m.-4:30 p.m. Invited paper:
H. De Snoo, University of Groningen, Netherlands -
*"Spectral theory for equations with λ -depending
boundary conditions"*
- 4:30 p.m.-5:00 p.m. Invited paper:
A. Dijksma, University of Groningen, Netherlands -
*"Unitary colligations and characteristic
functions in Krein spaces"*
- 5:00 p.m.-5:30 p.m. Contributed paper:
W. Allegretto, University of Alberta -
*"Second Order Elliptic Equations with
Degenerate Weight"*

SESSION 4b - Chair: I. Koltracht, University of Connecticut

E 241

- 3:30 p.m.-4:00 p.m. Invited paper:
M. Tismenetsky, IBM Scientific Center, Haifa -
*"Inversion of Block Toeplitz and Related
Matrices"*
- 4:00 p.m.-4:30 p.m. Invited paper:
R. Ellis, University of Maryland - *"Orthogonal
Systems Related to Infinite Hankel Matrices"*
- 4:30 p.m.-5:00 p.m. Invited paper:
T. Shalom, Tel Aviv University, Israel -
*"On Bezoutian of Non-square Matrix Polynomials
and Inversion of Matrices with Non-square Blocks"*
- 5:00 p.m.-5:30 p.m. Invited paper:
A. Ben-Artzi, Tel Aviv University, Israel -
*"Nonstationary Inertia Theorems, Dichotomy and
Applications"*

TUESDAY, AUGUST 23:

SESSION 5 - Chair: B.A. Francis, University of Toronto

E 243

8:30 a.m.-9:20 a.m.

Plenary lecture:

P. Dewilde, Technical University of Delft,
Netherlands - *"Approximate Matrix Extensions
and Applications in Modelling Theory"*

9:20 a.m.-9:50 a.m.

Invited paper:

H. Baumgärtel, Academy of Science, D.R. Germany -
"On Causal Nets of Operator Algebras"

REFRESHMENTS

SESSION 6 - Chair: H. Dym, Weizmann Institute

E 243

10:10 a.m.-11:00 a.m.

Plenary lecture:

T. Kailath, Stanford University, California -
"Generalized Gohberg-Semencul formulas"

11:00 a.m.-11:30 a.m.

Invited paper:

B. Korenblum, SUNY, New York - *"Unimodular
Mobius-Invariant Contracting Divisors for the
Bergman Space"*

11:30 a.m.-12:00 p.m.

Invited paper:

S. Prössdorf, Academy of Sciences of
the GDR, Berlin - *"Numerical Analysis for
Singular Integral Equations"*

LUNCH

SESSION 7 - Chair: P. Lancaster, University of Calgary

E 242

1:10 p.m.-2:00 p.m.

Plenary lecture:

K.R. Davidson, University of Waterloo -
*"Finite Dimensional Problems in Operator
Theory"*

2:00 p.m.-2:30 p.m.

Invited paper:

C. Davis, University of Toronto - *"The norm
of a dispersion mapping"*

2:30 p.m.-3:00 p.m.

Invited paper:

E.M. Semenov, University of Voronezh, U.S.S.R. -
*"The Geometrical Properties of Operators Acting
on L_p "*

COFFEE/TEA

SESSION 8a - Chair: D.C. Lay, University of Maryland

E 243

- 3:30 p.m.-4:00 p.m. Contributed paper:
K.F. Taylor, University of Saskatchewan -
"Projections in group C^* -algebras"
- 4:00 p.m.-4:30 p.m. Contributed paper:
J.H. Fourie, Potchefstroom University,
South Africa - "On Ultra Weak Type
Topologies on $L(E,F)$ "

SESSION 8b - Chair: L. Rodman, College of William & Mary, VA

E 241

- 3:30 p.m.-4:00 p.m. Contributed paper:
A.F. Dos Santos, Instituto Superior Técnico,
Portugal - "General Wiener-Hopf Operators
and convolution equations on a finite interval"
- 4:00 p.m.-4:30 p.m. Contributed paper:
A.B. Kon, Technion, Haifa, Israel - "Inverse
of Wiener-Hopf Type Operators"

SESSION 9 - Chair: R.S. Phillips, Stanford University

Village Park
Inn

- 5:15 p.m.-6:15 p.m. Plenary session:
I. Gohberg, Tel Aviv University, Israel -
"Mathematical Tales and Gossips"
- 6:15 p.m.-7:00 p.m. Cocktails
- 7:00 p.m.-10:00 p.m. Banquet
After-dinner speaker: S. Goldberg,
University of Maryland

WEDNESDAY, AUGUST 24:

SESSION 10a - Chair: P. DeWilde, Technical University of Delft

E 243

- 8:30 a.m.-9:00 a.m. Invited paper:
I. Koltracht, University of Connecticut -
"Efficient Algorithms for Structured matrices
and kernels"
- 9:00 a.m.-9:30 a.m. Contributed paper:
P.G. Spain, University of Glasgow, Scotland -
"Numerical Approximation of Hankel Operators"
- 9:30 a.m.-10:00 a.m. Contributed paper:
V. Pan, SUNYA, Albany, New York - "Fast and
efficient parallel inversion of (block)
Toeplitz matrices"
- 10:00 a.m.-10:30 a.m. Contributed paper:
Q. Ye, University of Calgary - "Variational
Properties and Rayleigh Quotient Algorithms
for Hermitian Matrix Pencils"

SESSION 10b - Chair: H. Bart, Erasmus University, Rotterdam E 241

- 8:30 a.m.-9:00 a.m. Invited paper:
B. Mityagin, Ohio State University, Columbus -
"Logarithm of Products of Operator Exponentials"
- 9:00 a.m.-9:30 a.m. Contributed paper:
J. Janas, Institute of Mathematics PAN, Poland -
"Operators of ω type and their properties"
- 9:30 a.m.-10:00 a.m. Contributed paper:
K. Stroethoff, University of Montana -
"Compact Hankel operators on the Bergman space"
- 10:00 a.m.-10:30 a.m. Contributed paper:
T.H. Kuo, National Chiao Tung University, Taiwan -
*"Operator Versions of the Convergence of
Regular Measures on F-Spaces"*

REFRESHMENTS

- 11:00 a.m.-9:30 p.m. Excursion to the Mountains.

THURSDAY, AUGUST 25:

SESSION 11 - Chair: J.W. Helton, University of California E 243
at San Diego

- 8:30 a.m.-9:20 a.m. Plenary lecture:
H. Widom, University of California, Santa Cruz -
"Generalized Wiener-Hopf Determinants"
- 9:20 a.m.-9:50 a.m. Invited paper:
E.V. Meister, Technische Hochschule
Darmstadt, F.R.G. - *"Wiener-Hopf factorization
of certain non-rational matrix functions
in mathematical physics"*

REFRESHMENTS

SESSION 12 - Chair: M. Tismenetsky, IBM, Haifa, Israel E 243

- 10:10 a.m.-11:00 a.m. Plenary lecture:
M.A. Kaashoek, Vrije Universiteit, Amsterdam -
"Regular matrix polynomials"
- 11:00 a.m.-11:30 a.m. Invited paper:
R.C. Thompson, University of California at
Santa Barbara - *"Divisibility relations
Satisfied by the Invariant Factors of a
Matrix Product"*
- 11:30 a.m.-12:00 a.m. Invited paper:
H. Schneider, University of Wisconsin -
"Max Balancing of a weighted directed graph"

LUNCH

SESSION 13a - Chair: R. Arocena, Universidad del Uruguay

E 243

- 1:10 p.m.-2:00 p.m. Plenary lecture:
B. Gramsch, University of Mainz, West Germany -
*"Frechet fibre bundles in the operator theory
with applications to algebras of
pseudodifferential operators"*
- 2:00 p.m.-2:30 p.m. Invited paper:
M. Cotlar, Universidad Central de Venezuela -
*"Lifting theorems in scattering
systems with two evolution groups"*
- 2:30 p.m.-3:00 p.m. Invited paper:
R. Mennicken, Universität Regensburg, West Germany -
*"Equivalence of Boundary Value Operators and
their characteristic matrices"*

SESSION 13b - Chair: K. Glover, Cambridge University

E 241

- 2:00 p.m.-2:30 p.m. Invited paper:
H. Bart, Erasmus University, The Netherlands -
*"Complementary Triangular Forms of
Upper Triangular Toeplitz Matrices"*
- 2:30 p.m.-3:00 p.m. Invited paper:
L. Lerer, Israel Institute of Technology, Haifa -
*"Inverse problems for block Toeplitz matrices,
orthogonal matrix polynomials and coprime
symmetric factorizations"*

COFFEE/TEA

SESSION 14a - Chair: H. Schneider, University of Wisconsin

E 243

- 3:30 p.m.-4:00 p.m. Invited paper:
C.R. Johnson, College of William & Mary,
Virginia - *"Matrix Completion Problems:
Explicit Formulae and Solutions"*
- 4:00 p.m.-4:30 p.m. Invited paper:
F. Van Schagen, Vrije Universiteit, Amsterdam -
"Eigenvalues of Completions of Submatrices"
- 4:30 p.m.-5:00 p.m. Contributed paper:
L. Elsner, Universität Bielefeld, F.R.G. -
*"On the spectral radius of entrywise
functions of matrices"*
- 5:00 p.m.-5:30 p.m. Invited paper:
H. Woerdeman, Vrije Universiteit, Amsterdam -
*"Strictly Contractive and Positive Completions
for Block Matrices"*

SESSION 14b - Chair: C. Sadosky, Howard University, Washington E 241

- 3:30 p.m.-4:00 p.m. Invited paper:
Y. Rodin, Illinois - "*The Riemann boundary problem on Riemann surfaces, integrable systems and soliton theory*"
- 4:00 p.m.-4:30 p.m. Contributed paper:
P.J. Browne, University of Calgary - "*Two Parameter Eigencurve Theory*"
- 4:30 p.m.-5:00 p.m. Contributed paper:
F. Farid, University of Calgary - "*Spectral Properties of Diagonally Dominant Infinite Matrices*"
- 5:00 p.m.-5:30 p.m. Invited paper:
L.S. Frank, Catholic University of Nijmegen - "*Coercive Singular Perturbations: Reduction to Regular Perturbations and Applications*"
- 6:00 p.m.-8:00 p.m. Wine and Cheese Party Faculty Club

FRIDAY, AUGUST 26:

SESSION 15 - Chair: K. Clancey, University of Georgia E 243

- 8:30 a.m.-9:20 a.m. Plenary lecture:
R.S. Phillips, Stanford University, California - "*Moduli Space, Heights and Isospectral Sets of Planar Domains*"
- 9:20 a.m.-9:50 a.m. Invited paper:
H. Isaev, Azerbaijan Academy of Sciences, Baku - "*Multi-parameter spectrums*"

REFRESHMENTS

SESSION 16 - Chair: J.A. Ball, Virginia Polytech Institute E 243

- 10:10 a.m.-11:00 a.m. Plenary lecture:
J.W. Helton, University of California at San Diego - (TITLE TO BE ANNOUNCED)
- 11:00 a.m.-11:30 a.m. Invited paper:
K. Glover, Cambridge University, England - "*Maximum Entropy and Risk Aversion*"
- 11:30 a.m.-12:00 a.m. Invited paper:
R. Duducava, Georgian Academy of Science, Tbilisi - "*Regularization of the Singular Integral Operators*"

LUNCH

SESSION 17a - Chair: C.R. Johnson, College of William & Mary, E 243
Virginia

- 1:15 p.m.-1:45 p.m. Invited paper:
D.C. Lay, University of Maryland -
*"Negative Eigenvalues of Selfadjoint
Extensions of Band Matrices"*
- 1:45 p.m.-2:15 p.m. Invited paper:
A.C.M. Ran, Vrije Universiteit, Amsterdam -
*"On strong α -stability of invariant subspaces
of matrices"*
- 2:15 p.m.-2:45 p.m. Invited paper:
L. Rodman, College of Mary & William, Virginia -
*"Stability of invariant lagrangian subspaces
and Riccati equations"*

SESSION 17b - Chair: L.S. Frank, Catholic University of E 241
Nijmegen

- 1:15 p.m.-1:45 p.m. Invited paper:
K. Clancey, University of Georgia -
*"Theta Functions and Representing
Measures on Multiply Connected Domains"*
- 1:45 p.m.-2:15 p.m. Contributed paper:
R. Arocena, Universidad del Uruguay -
*"A class of translation invariant forms,
dilations of commutants and maximum entropy"*
- 2:15 p.m.-2:45 p.m. Contributed paper:
D. Shemesh, Rafael, Haifa - *"Subspaces Which
are Left Invariant Under Certain Families of
Operators"*

COFFEE/TEA

SESSION 18 - Chair: M.A. Kaashoek, Free University, Amsterdam E 243

- 3:10 p.m.-3:45 p.m. Invited paper:
I.M. Spitkovski, Academy of Sciences, Odessa -
"Almost periodic factorization"
- 3:45 p.m.-4:00 p.m. Concluding Remarks